"PATENT"

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF: Masahiko Iijima, et al.	§	EXAMINER:	N. Preisch
SERIAL NUMBER: New Application (DIV of 09/652,954)	§	GROUP ART UNIT:	1764
FILED: October 19, 2001	§	ATTY. DOCKET NO.:	JHT-0109
FOR: Hydrotreating Catalyst and Process for Hydrotreating Hydrocarbon Oils Using the Same	§		

PRELIMINARY AMENDMENT

Please enter the following amendments preliminary to examination of this application and calculation of the filing fees. A version with markings showing the changes made is attached hereto.

IN THE CLAIMS

Replace claims 1, 2 and 3 with the following amended claims 1, 2 and 3 (formerly claims 12-14 of the parent application):

1. A process for hydrotreating a hydrocarbon oil under hydrotreating conditions in the presence of hydrogen by bringing the hydrocarbon oil into contact with a hydrotreating catalyst comprising a refractory inorganic oxide matrix dispersed with a hydrogenation-active component, said hydrogenation-active component comprising at least one active component (A) selected from group 6A elements, and/or at least one active component (B) selected from group 8 elements, wherein

(1) total content of said hydrogenation-active component is 0.02moles to 0.4 moles per mole of all of the elements that constitute the catalyst,

(2) of said hydrogenation-active component, any one, when present at 0.002 mol/mol or more, satisfies the following relationship (1), established by the EPMA line analysis:

$$N_{max} - N_{min} \leq 2\times[3\times(N_0)^{0.5}+0.2\times N_0] \quad (1)$$

wherein N_{max} , N_{min} and N_0 are the maximum, minimum and average contents of the hydrogenation-active component, determined by the EPMA line analysis,

or following relationship (2) , established by the EPMA plane analysis:

$$0.8 \leq \text{S parameter} < 1,\ 0.8 \leq \text{P parameter} < 1 \quad (2)$$

wherein S parameter and P parameter are an index for size uniformity and distribution of the active component particles, respectively, determined by the EPMA plane analysis, and

(3) one or more diffraction lines relevant to crystalline component are observed by powder X-ray diffraction analysis.

2. The process for hydrotreating a hydrocarbon oil according to Claim 1, wherein said hydrocarbon oil is at least one selected from straight-run naphtha, catalytically cracked naphtha, steam-cracked naphtha, thermally cracked naphtha, light gas oil, vacuum gas oil, catalytically cracked gas oil and thermally cracked gas oil.

3. The process for hydrotreating a hydrocarbon oil according to Claim 2, wherein said hydrocarbon oil is at least one selected from light gas oil, vacuum gas oil and cracked gas oil.

Add claims 4-13 as follows:

4. The process of Claim 1, wherein said refractory inorganic oxide matrix comprises at least one oxide selected from alumina, silica, magnesia, calcium oxide, boria, zirconia, titania, thoria, ceria, hafnia, phosphorus oxide, alumina-silica, alumina-magnesia, alumina-boria, alumina-zirconia, alumina-thoria, alumina-titania-zirconia, silica-magnesia, silica-zirconia, silica-boria, silica-thoria, silica-titania, alumina-silica-zirconia, alumina-silica-boria, alumina-silica-magnesia, alumina-silica-halfnia, alumina-silica-phosphorus oxide and alumina-silica-boria-phosphorus oxide.

5. The process according to Claim 4, wherein said refractory inorganic oxide matrix comprises at least one oxide selected from alumina, silica, magnesia, alumina-silica, alumina-magnesia, alumina-boria, alumina-titania, alumina-phosphorus oxide, alumina-silica-magnesia, alumina-silica-boria, alumina-silica-phosphorus oxide and alumina-silica-boria-phosphorus oxide.

6. The process according to Claim 5, wherein said refractory inorganic oxide matrix comprises an oxide selected from alumina-silica, alumina-silica-phosphorus oxide and alumina-silica-zirconia.

7. The process according to Claim 1, wherein said hydrogenation-active component (A) comprises molybdenum and/or tungsten.

8. The process according to Claim 7, wherein said hydrogenation-active component (A) comprises molybdenum.

9. The process according to Claim 1, wherein said hydrogenation-active

component (B) comprises at least one metal component selected from cobalt, nickel, palladium and platinum.

10. The process according to Claim 7, wherein said hydrogenation-active component (B) comprises cobalt and/or nickel.

11. The process according to Claim 1, wherein said hydrogenation-active component comprises a composite component selected from molybdenum-cobalt, molybdenum-nickel and molybdenum-cobalt-nickel.

12. The process according to any one of Claims 1, 7 or 9, wherein said hydrogenation-active component comprising said active component (A) and/or (B) is further incorporated with a third active component (C) comprising at least one element selected from the group 1B, 2B and 7A elements.

13. The process according to Claim 12, wherein said active component (C) is selected from copper, zinc, manganese and rhenium.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE:

1. A process for hydrotreating a hydrocarbon oil under hydrotreating conditions in the presence of hydrogen by bringing the hydrocarbon oil into contact with **[the hydrotreating catalyst of Claim 11]** **a hydrotreating catalyst comprising a refractory inorganic oxide matrix dispersed with a hydrogenation-active component, said hydrogenation-active component comprising at least one active component (A) selected from group 6A elements, and/or at least one active component (B) selected from group 8 elements, wherein**

(1) total content of said hydrogenation-active component is 0.02moles to 0.4 moles per mole of all of the elements that constitute the catalyst,

(2) of said hydrogenation-active component, any one, when present at 0.002 mol/mol or more, satisfies the following relationship (1), established by the EPMA line analysis:

$$N_{max} - N_{min} \leq 2\times[3\times(N_0)^{0.5}+0.2\times N_0] \quad (1)$$

wherein N_{max}, N_{min} and N_0 are the maximum, minimum and average contents of the hydrogenation-active component, determined by the EPMA line analysis,

or following relationship (2), established by the EPMA plane analysis:

$$0.8 \leq \text{S parameter} < 1,\ 0.8 \leq \text{P parameter} < 1 \quad (2)$$

wherein S parameter and P parameter are an index for size uniformity and distribution of the active component particles, respectively, determined by the EPMA plane analysis, and

(3) one or more diffraction lines relevant to crystalline component are observed by powder X-ray diffraction analysis.

2. The process for hydrotreating a hydrocarbon oil according to Claim 1,

wherein said hydrocarbon oil is at least one selected from **[the group consisting of]** straight-run naphtha, catalytically cracked naphtha, steam-cracked naphtha, thermally cracked naphtha, light gas oil, vacuum gas oil, catalytically cracked gas oil and thermally cracked gas oil.

3. The process for hydrotreating a hydrocarbon oil according to Claim 2, wherein said hydrocarbon oil is at least one selected from **[the group consisting of]** light gas oil, vacuum gas oil and cracked gas oil.

Claims 4-13 have been added:

4. The process of Claim 1, wherein said refractory inorganic oxide matrix comprises at least one oxide selected from alumina, silica, magnesia, calcium oxide, boria, zirconia, titania, thoria, ceria, hafnia, phosphorus oxide, alumina-silica, alumina-magnesia, alumina-boria, alumina-zirconia, alumina-thoria, alumina-titania-zirconia, silica-magnesia, silica-zirconia, silica-boria, silica-thoria, silica-titania, alumina-silica-zirconia, alumina-silica-boria, alumina-silica-magnesia, alumina-silica-halfnia, alumina-silica-phosphorus oxide and alumina-silica-boria-phosphorus oxide.

5. The process according to Claim 4, wherein said refractory inorganic oxide matrix comprises at least one oxide selected from alumina, silica, magnesia, alumina-silica, alumina-magnesia, alumina-boria, alumina-titania, alumina-phosphorus oxide, alumina-silica-magnesia, alumina-silica-boria, alumina-silica-phosphorus oxide and alumina-silica-boria-phosphorus oxide.

6. The process according to Claim 5, wherein said refractory inorganic oxide